The Practice of Architecture in California

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Part 1

Introduction

The Report on the Practice of Architecture in California provides information on the distinct aspects of architectural practice in California; the goals and process for the Job Analysis Survey that was conducted by the California Board of Architectural Examiners (CBAE); the comparison of current and previous job analysis surveys; the results of the survey including tables of tasks and knowledges in order of ranking; and the resultant Test Plan that will be used for the CBAE California Supplemental Examination.

This report will provide information to various segments of the architectural profession. Educators may use this information to better prepare students for success as candidates in the national examination as well as the California Supplemental Examination and for success in the practice of architecture in California. Though the Job Analysis data reflects California practice, many of the tasks and knowledges may also be applicable to architectural practice in settings outside of California. Thus, professional and public organizations such as the American Institute of Architects (AIA), the National Council of Architectural Registration Boards (NCARB) and regulatory agencies may use this research as background for responding to changes in the profession in general.

Summary of comparison between 1987 and 1997 surveys of the profession

In 1987, CBAE began developing a new architectural licensing examination–the California Architect Licensing Examination (CALE). In preparation for the development of this examination, CBAE conducted a survey of the profession to identify and quantify the minimum architectural skills and competencies necessary to ensure the protection of the public health, safety, and welfare. The CALE was administered in California from 1987 through 1989.

The methodology of the 1987 Occupational Analysis Survey and the 1997 Job Analysis Survey differ in process and format. The 1987 survey was designed by starting with a previous survey done ten years before. By adding or subtracting questions based on the judgment of a professional panel, a new survey instrument emerged. The 1987 survey was formatted following the structure of the nine sections of the written examination as follows:

- General Structure
- Lateral Forces
- Long Span
- Life Safety/Mechanical, Plumbing, and Electrical
- Methods and Materials
- Professional Practice

- Programming and Planning
- Site Analysis/Site Design
- Building Design

The 1997 survey started with a completely new approach. A diverse panel of professionals including educators, large and small practitioners, and public-sector architects was assembled to determine the content of the new survey instrument. This new survey was divided into two distinct areas of architectural practice:

1. Organization of Architectural Practice
2. Delivery of Architectural Services

When comparing the results of the two surveys that were conducted approximately ten years apart, a significant pattern or shift in the practice of architecture can be detected. This pattern of change can be determined by matching the highest *mean importance* ranking of items in both surveys.

The 1987 survey assigned top importance to issues that related to: (in order of importance)

- Making buildings water and moisture-proof
- Roof slopes, application and flashing
- Material characteristics for fire safety
- Roof drainage and water disposal
- Moisture and environmental control
- Design and detail ramps and stairs
- Special safety and emergency egress requirements
- Dampproofing and waterproofing subgrade walls
- Codes and regulations

All of the above are contained in the highest priority issue identified in the 1997 survey (laws, codes, regulations, and standards).

The 1997 survey assigned top importance to issues that related to: (in order of importance)

- Laws, codes, regulations, and standards
- Program information related to design solution
- Scope of design services
- Communication of design decisions for project implementation
- Relationships with relevant regulatory agencies
- Integrate appropriate building systems and materials
- Natural systems and the built environment related to a site or facility
- Role of architect in relationship with client and users
- Relationships with consultants and team members

A review of these items reveal that laws, codes, regulations and standards ranked highest in the latest survey followed by design decisions and scope; client communication; consultant relationships;

When comparing the results of the two surveys that were conducted approximately ten years apart, a significant pattern or shift in the practice of architecture can be detected.

and natural systems and the built environment as they relate to a site or facility. Moisture concerns followed by codes and regulations ranked highest a decade earlier. This suggests that the profession is becoming more sophisticated and is accepting an expanded level of challenge. Building mechanics and technical considerations are still very important, but they have been joined by concerns dealing with design solutions, regulations and regulatory agencies, and the expanding role of the architect as he/she interacts with clients, users, and other consultants. Some of the differences in the two surveys may be the result of the change in the methodology used in constructing the survey instrument; however, a change has occurred adding relationships with **people** to the technical issues dealing with **things.**

Another factor to consider when analyzing the results of the survey is the assumption made by members of the architectural profession that regulatory agencies have grown more pervasive both in number and increased power during the last decade. Dealing with an increased number of agencies with ever increasing regulations has expanded the time and energy needed in the approval process.

The 1997 survey contained items that were not present in the 1987 survey. These items were also ranked the lowest in mean importance on the 1997 survey. The fact that these items now appear on the survey is significant and may indicate increasing challenges and responsibilities for the architect of the future.

These items were as follows:

- Expanded services: peer review, facilities management and post occupancy studies and evaluations
- Inter-relationships of societal factors and the built environment (cultural differences, socioeconomic and political, and community as a whole)
- Professional development activities (continuing education, AIA activities and intern development)
- Model for office organization
- Business management systems to conduct an architectural practice
- Project feasibility analysis

Background of 1997 survey

In January 1997, the California Board of Architectural Examiners (CBAE) contracted with Professional Management and Evaluation Services, Inc. (PMES) to develop a new test plan for the California Supplemental Examination for implementation beginning with the February 1999 examination administration.

A licensure examination's test plan is the critical connection between the test and professional practice. The test plan defines the content of the examination by identifying the knowledge, skills, and abilities required for minimally acceptable competence, and by specifying the relative emphasis among each of these proficiencies. To be in compliance with state and federal laws, a licensure examination program must be grounded upon actual professional practice; it must be based on the tasks that licensed professionals actually perform in their current practice.

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PMES conducted a job analysis to develop the test plan for the California Supplemental Examination. This method involves a survey of licensed California architects—the content experts for the subject matter to be covered by this examination. An accurate description can be compiled of the current nature and scope of architecture in California as a whole by enumerating the specific details of actual practice for individuals in a large representative sample of licensed architects. Thus, the job analysis provides the requisite empirical foundation for the development of a valid, defensible test plan.

There were two steps involved in conducting the job analysis survey:

- the construction of an inventory of the tasks typically performed by architects when working on projects in the state of California
- the distribution and retrieval of survey questionnaires from a selected sample of California-licensed, practicing architects, and the subsequent analysis of data collected from the survey respondents.

The California Supplemental Examination Subcommittee (CSE Subcommittee), charged with the overall responsibility for the California Supplemental Examination, developed the conceptual framework for the job analysis survey. In doing so, the CSE Subcommittee identified major changes in practice that had occurred in the profession since the last CBAE Job Analysis and identified evolving trends in practice that should be addressed by the Job Analysis Committee. The CSE Subcommittee also responded to the directive resulting from legislative oversight that the California Supplemental Examination not duplicate testing of content covered by the national Architect Registration Examination (ARE).

CSE Subcommittee also reviewed the following definition of a "well-qualified" architect, which was developed by the Board during its strategic planning session. The "quality architect" possesses multiple skills and capabilities including:

- Ethical behavior
- Creative ability and skill in synthesizing diverse sources of information
- Budget management skills and reasonable fees
- Ability to coordinate and lead teams
- Communication skills
- High performance in delivering contracted services on budget and on time
- Ability to interpret client desires

CSE Subcommittee determined that the Job Analysis Committee's goals should be to develop a job analysis that:

- Identifies distinct aspects of architectural practice in California
- Identifies content that is essential to the practice of architecture
- Addresses changes/emerging trends in practice
- Confirms an expected level of competence of a newly licensed architect

The conceptual framework provided the Job Analysis Committee with guidelines for addressing the issues critical to the profession. In responding to the goals provided by the OES, the Job Analysis Committee considered how to begin structuring the major categories of architectural practice in general. The Committee unanimously agreed that the framework should not be structured along the lines of the traditional phases of practice, in part because that approach presupposes that the end result of the architectural process is always a building.

Influences on California Architectural Practice

While in most states the ARE is accepted as the sole examination requirement for a practicing architect, the practice context in some states, such as California, is marked by special circumstances or conditions that distinguish the practice setting and that require additional knowledge and skills for safe and effective architectural practice. Although the ARE tests discrete knowledge, skills, and abilities necessary to provide the various services required in the design and construction of buildings, it does not currently address a candidate's ability to integrate that knowledge into the complex framework of practice that is necessary to be a competent architect in the State of California.

A fundamental precept underlying California's examination and licensure process is that practice of architecture in this state is inextricably connected to the physical, social, political, and economic context which sets the state apart and makes it unique. At first glance, it may appear that California has no particular characteristic not possessed by some other state. For example, other states have unique coastal exposure, mountain ranges, and climatic variations. But when closely examined, California presents a complex context for architectural practice that sets it apart from all other states by combining a multitude of diverse characteristics. It follows that broader skills and knowledge are necessary to practice safely and effectively here.

California's great physical size, large and diverse population, diverse landscape and climate, high seismicity, and particular legal framework create an intricate context for the conduct of architectural practice. The following information, pertaining to the unique physical aspects and social and legal characteristics of life in California, illustrates the particular complexity and distinct nature of architectural practice in the state and supports the continued development and administration of the supplemental examination.

Size

California has approximately 838 miles of coastline along the Pacific Ocean. The state encompasses almost 159,000 square miles of land, approximately 4% of all the land in the United States. It ranks third in size among the states, surpassed only by Alaska and Texas. The shape of the state in relation to the coastline on the west and mountainous terrain on the east has influenced the way in which urbanization has occurred since the times of early settlement. This configuration has led to a linear distribution of urbanization and corresponding adaptation of infrastructure and services. Rapid linear and low intensity urbanization has been facilitated by a transportation system heavily dependent on the automobile.

California's population increased 25% between 1980 and 1990 and is expected to increase another 50% by 2025.

Implications for Architectural Practice

The capacity of the state for new construction activity remains high as urban areas mature and intensify and new growth occurs. The result is a high volume of building activity with a broad variety of project types. Architects in California must be prepared to deal with this volume and complexity.

Population

California is the nation's most populous state (over 30 million people), which is over 40 percent more than the second most populous state of New York. One out of nine people in the U.S. lives in California. More than 90 percent of California's population resides in urban areas, with 27 percent of the state's residents living in the top ten most populated cities and with 44 cities having populations in excess of 100,000. The state experienced an increase in population of more than 25 percent between 1980 and 1990 alone. It is estimated that the population will increase another 50 percent by the year 2025. The major increase is estimated to occur in the Hispanic population, increasing from approximately 29 percent of the state's total population to 42 percent. In contrast, the non-Hispanic white population is estimated to reduce from approximately 52 percent to 33 percent.

While most of the urban areas are located along the Pacific coast, there are significant urban centers in the central interior valley areas. Los Angeles and the surrounding metropolitan area represent the second largest concentration of population in the country, second only to the New York metropolitan area.

California's position at the eastern edge of the Pacific Rim and at the border with Mexico has created a particularly unique mix of populations. No other state has experienced influx and change in demographic composition on such a massive scale in such a short period of time. Along with ethnic diversity have come changes in communication, business practices, lifestyles, and other facets of a multi-cultural environment.

Implications for Architectural Practice

The California population includes over 20 percent of all licensed architects in the U.S. Of all building-related professions, architecture requires a more complex combination of highly disciplined communication and technical skills. The myriad of participants in the building construction industry, from so many educational and cultural backgrounds, make the practice of architecture more complex and challenging in California. Often cultural differences mean a completely different understanding of the same objective circumstances, hence more energy must be advanced to reach common goals or to even discover what the goals are.

California's varied landscape and climate combined with its high seismicity impact architectural practice in the State.

Varied Landscape and Climate

California has exceptionally varied geography. Within its boundaries are the highest and lowest points in the contiguous United States–Mount Whitney reaches nearly 14,500 feet and is only 85 miles from Death Valley which is the lowest point in the Western Hemisphere at more than 280 feet below sea level. The state stretches over 800 miles from north to south.

California has a varied climate pattern, the result of its complex geography and wide latitudinal range. Temperatures are mild along the coast with relatively small variations between the warmest and coolest months; the southern coast is somewhat warmer than the central and northern coasts. The Central Valley has wide temperature variations, but other parts of the interior are either markedly hotter (Death Valley and the Mojave Desert, for example) or colder (the lofty peaks of the Sierra Nevada).

No other state can boast the varied types of coastal exposure of California. Few, if any states can claim the climatic variations. None can claim the geographic variation, and no other state has the varied geologic conditions. These unique climatic and physiographic conditions have greatly influenced California's settlement patterns, economic development, and political environment. In addition, these conditions present a unique confluence of natural hazards faced by California inhabitants, with the combination of earthquake, flood, and wildfire hazards concentrated in its most populous areas.

Implications for Architectural Practice

Architects who practice in California are faced with landscape and climatic conditions more varied than in any other state. These conditions require integration of knowledge corresponding to these conditions and applying that knowledge appropriately in the California setting. The varied climate and landscape produce a corresponding variation in construction methods and materials, placing a greater demand on the knowledge and skill base required for safe practice. More importantly, the context of California requires appropriate project designs that consider its confluence of natural hazards. Finally, these conditions often result in the employment of specialized research assistants and consultants whose work must be coordinated by and with the architect.

High Seismicity

The well-known San Andreas Fault, which cuts through the Coast Ranges as a visible fracture in the Earth's crust, is one of the most active faults and certainly the most visible source of seismic activity. However, there are numerous active earthquake faults throughout California, and several of the recent damaging earthquakes have occurred on "inactive" or "dormant" faults. There have been twenty

earthquakes over a magnitude of 5.8 on the Richter scale in the past 20 years.

The Northridge quake that occurred on January 17, 1994 had a magnitude of 6.7 on the Richter scale, caused 57 deaths, injured nearly 9,000 people, and caused damage in excess of $20 billion. The chance of an earthquake of a magnitude of at least 7.0 occurring in California within the next 25 years is better than 50 percent, with the odds increasing as time progresses. Relative to the California Building Code, the majority of the state is classified as Seismic Zone 4 (the highest classification).

Following the Northridge quake, the Seismic Safety Commission (SSC) studied the outcomes of the earthquake relative to seismic safety issues at the governor's executive order. The SSC's recommendations were presented in a report entitled "Turning Loss to Gain." The report acknowledged that California buildings, thanks to seismic codes written and enforced here for the last 50 years, are better able to withstand earthquakes than buildings elsewhere. California's buildings and infrastructure, and the people and programs that address the state's earthquake risk, are recognized as being among the best in the world.

Implications for Architectural Practice

While the building codes and practices are deemed generally adequate to protect lives, the SSC report found significant weaknesses in how planning laws and the design and construction of buildings and lifelines in the state are carried out.

In the report, the SSC stated that its single most important recommendation was "the enhancement of quality in design and construction." Of particular note is the report's focus on the need for design and construction professionals to protect Californians from the economic disasters that earthquakes cause. This is a dramatic departure from the previous emphasis by the commission on preventing human injury or loss of life due to building failure and may be a reflection of the changing California economy. It is yet another way in which the demands placed on architects, as members of the construction industry, are expanding.

The report also recommends the vigorous enforcement of licensing board rules regarding professional competence in seismic safety matters. This is especially pertinent to the California Supplemental Examination given that architects are primarily responsible for the seismic safety of architectural elements in buildings as well as for the coordination of architectural and engineering systems.

California laws and regulations require architects to practice in a unique legal environment.

Legal Framework

The unique physical and social environment of California is reflected in the structure, function, and actions of its government. California has led the nation in new legislation affecting the building and design industries. Examples of these laws and resulting regulations include the Field Act, Coastal Zone Initiative and California Coast Act, California Environmental Quality Act, energy conservation laws, disabled access laws, mechanics lien laws, Design Professionals Lien Law, Hospital Seismic Safety Act, Essential Services Building Seismic Safety Act, and unreinforced masonry buildings laws.

Many of these legislative acts were unprecedented in this country. California's disabled access regulations, for example, eventually served as a model for other states and drafts of standards and regulations that are found in the Americans with Disabilities Act. The same can be said of the state's energy regulations. In other instances, legislation has remained unique to California (e.g., the Coastal Zone Conservation Act and mechanics lien laws).

California architects must be familiar with the regulations that govern or influence the nature of their work and the dynamic political culture to which they must continuously adapt. Local design regulations and regulations pertaining to the use of land (its subdivision, improvement, and sale), with their resultant effects on local government, combine to make the practice of architecture in California distinctive.

Implications for Architectural Practice

Architectural practice has been, and continues to be, directly and significantly influenced by the nature of our state government and its legislation. The extent and complexity of the regulatory process, for example, has led to different procedures for documentation of building design for conformance with the state's regulations. This requires knowledge and skills specifically tailored to practice in California.

Not only does this legislative environment affect the buildings that architects design, but also the way they work. In many cases new fields of specialization within the broad spectrum of practice have been created, and many disciplines have been added to the teams that build this state as direct results of the state's innovative legislative processes. As a further result, the role of the architect in government has expanded and diversified.

For example, California architects have been influential in the development of regulations pertaining to retrofitting of unreinforced masonry buildings. Others have developed specialized areas of practice directed to seismic upgrade of existing structures.

One significant consequence of an intricate regulatory environment is that the responsibility for determining priorities and resolving conflicts among regulations falls directly upon architects. This is one of many reasons it is so important for practitioners in California to have demonstrated knowledge and ability to apply the regulations unique to California.

Economy

California has the most productive economy of any U.S. state, leading in areas such as agriculture, energy, entertainment, forestry, mining, manufacturing, technology, tourism, and transportation. California also represents the world's seventh largest economic unit.

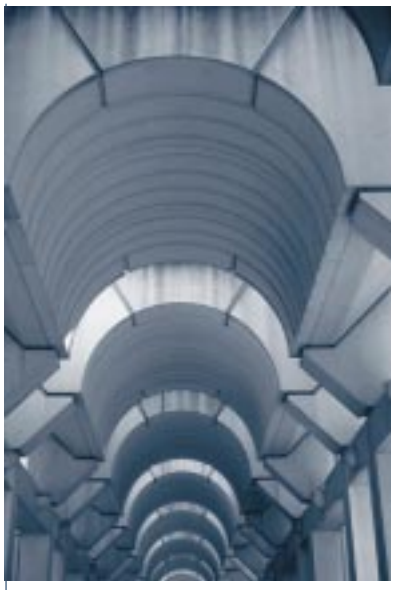
A significant consideration is California's global economic position as the result of its unique resources, combined with its location on the eastern edge of the Pacific Rim. Unequaled and increasing volumes of goods pass through the ports of Los Angeles and Long Beach and other ports to the north and south. Among many other things, this has resulted in the remaking of transportation links and distributions systems that have, and will continue to have, influence on settlement patterns, building types and redevelopment of previously urbanized areas that are already in a state of cultural flux due to immigration. This is merely one example of the growth and change in the California economy that is forecast to have major effects on the built environment of the twenty-first century.

Population increases in unsurpassed numbers are also forecast for the next 20 years. The nature of this increase, much of it from immigration from outside national borders will inevitably impact the entire infrastructure of the state. The result will be further urbanization and re-urbanization.

Implications for Architectural Practice

Advances in technology and in the speed of information exchange are affecting everyone. However, the architectural profession in particular is experiencing turmoil due to the impact of computers, CAD systems, telecommunications, and other technological innovations. The degree to which impacts of technology are magnified by the settings in California is significant.

The increase in use of alternative methods of project delivery, and the development of nontraditional special services (e.g., expert witness) are, in part, arising from the state's changing and growing economy. The importance of economic factors relative to the practice of architecture is evident. To the extent these factors are uniquely influencing practice in California is a subject of some debate. What is beyond dispute, however, is the fact that economic growth and change in California will act synergistically with its combination of unique characteristics already cited above. The



pressure to accommodate change with increased speed has traditionally impacted the profession, placing pressure on architects to stretch the limits of their capacity to practice safely. To meet these unprecedented challenges, the profession in California must continue on its innovative and leading edge track in order to adapt.

Structure of Job Analysis

There are two standard processes involved in the Job Analysis methodology for the development of a test plan for a licensure examination. The first process, logical analysis, is the initial definition of the target job domain and the development of a framework of categories of task proficiencies that characterize the work performed in the job domain. The second process of the job analysis, task analysis, entails determination of the relative importance of each category of task proficiencies based on observations collected from actual professional practice.

In this study, the goal of the logical analysis was the construction of an inventory of the tasks usually performed by architects when working on projects in the State of California. The task analysis phase of this study consisted of the distribution and retrieval of survey questionnaires from a selected sample of California-licensed, practicing architects, and the subsequent analysis of data collected from the survey respondents. For these functions, PMES convened and worked with CBAE-recommended qualified subject-matter experts.

The final, CBAE-approved version of the California Architectural Practice Job Analysis Survey contained four sections. Section 1: Biographical Information contained 16 questions covering such subjects as years of experience, educational background, primary workplace, position in firm, and hours worked. Section 2: Task Survey contained 33 task statements and 151 knowledge statements organized under two major categories and subdivided into five primary content categories:

I. ORGANIZATION OF ARCHITECTURAL PRACTICE
Application of knowledge necessary to manage and provide professional services in a competent, ethical, legal, cost-effective, and timely manner.

A. PROFESSIONAL SERVICES—The scope of services provided to a client that support the development of an architectural project.
B. PROFESSIONAL ORGANIZATION—The processes a practitioner uses for organizing human and physical resources to deliver services.
C. PROFESSIONAL RESPONSIBILITIES—The laws, regulations, and professional standards that guide architectural practice.

II. DELIVERY OF ARCHITECTURAL SERVICES

The application and integration of architectural principles and knowledge to create or modify built environments consistent with the protection of the public's health, safety, and welfare.

D. RESEARCH, DESIGN ANALYSIS AND PROGRAMMING—Knowledge of the procedures necessary for the assessment of relevant information in preparation for design of a project.

E. DESIGN IMPLEMENTATION—Synthesis and application of information that leads to a solution that responds to defined project requirements.

The Task Survey contained 33 task statements and 151 knowledge statements.

Section 3: Trends in Practice contained 10 questions covering such topics as computer technology, continuing education, IDP, and perception of the practice of architecture in the past and in the future. Section 4: Comments was an open comment section for respondents to provide any comments regarding any previous section of the survey.

Rating Scales

Rating scales are developed in order to rate the questions and tasks in a survey. PMES recommended that operationally explicit rating scales be developed, including operational definitions for active verbs, so that respondents could accurately and consistently rate the task and knowledge statements.

PMES worked with the Job Analysis Committee to first develop an explicit definition of frequency and importance. For the frequency scale, the appropriate scope of responsibility and temporal limits within which the respondents were to evaluate each task were explicitly defined. For the importance scale, the technical significance and implication for professional responsibility and impact on public well-being (health, safety, and welfare) were explicitly defined.

In addition, PMES and the Job Analysis Committee developed an explicit definition of the categories on the scales. This resulted in categories that were meaningful to architects given the specific substance and context of their practice. Listed below are the explicit definitions for the frequency and importance rating used in the California Architectural Practice Job Analysis Survey:

Frequency Rating Scale for Tasks

1- **Never perform:** I **never perform or have responsibility for** this task and **do not use knowledge** about how it is performed.

2- **Use knowledge only:** I **never actually perform** or have responsibility for this task, but I do **use, or need to have, knowledge** about how it is performed.

3- **Perform Less Than Annually:** I perform or have responsibility for this task **at least once in five years.**
4- **Perform More Than Annually:** I perform or have responsibility for this task **at least annually, but less than monthly.**
5- **Perform More Than Monthly:** I perform or have responsibility for this task **at least monthly,** but **less than weekly.**
6- **Perform More Than Weekly:** I perform or have responsibility for this task **at least weekly,** but **less than daily.**
7- **Perform Daily:** I perform or have responsibility for this task daily.

Importance Rating Scale for Tasks and Knowledges

1- **Not Important:** The task or knowledge is **technically inconsequential,** with **no implications** for professional responsibility for public well-being.
2- **Slightly Important:** The task or knowledge is of **limited technical significance,** with **minor implications** for professional responsibility for public well-being.
3- **Important:** The task or knowledge **is technically necessary but not fundamental,** with **moderate implications** for professional responsibility in that some impact on public well-being is possible.
4- **Very important:** The task or knowledge is **technically fundamental but not critical,** with **serious implications** for professional responsibility in that significant impact on public well-being is possible.
5- **Critically Important:** The task or knowledge is **technically critical** and **has major implications** for professional responsibility in that widespread impact on public well-being is possible.

Analysis of Survey Results

A stringent analysis of the survey results was conducted on both the importance and frequency_scales for the tasks; and on the importance scale for knowledge statements, as well as on the Biographical and Trends in Practice Questions. The results are described below.

Description of Survey Sample

The selected sample to receive the Job Analysis survey comprised 3,450 subjects (21.5% of the survey population of 16,014 individuals) and was broadly representative of the geographic distribution of architects and weighted equally in terms of newly-licensed and experienced architects. Several analyses were done to ensure that the sample was valid. The results of the analyses indicated no detectable sample bias; thus confirming that the sample was technically valid. Responses to biographical questions are provided below and provide a view of the biographical characteristics of the respondents.

Gender

	Female	Male
Total respondents	17%	83%
Licensed 7 years or less	26%	74%
Licensed 8-20 years	12%	88%
Licensed 21 years or more	4%	96%

Ethnic Background

Caucasian	79%
Asian	10%
Hispanic	4%
Filipino	2%
Native American	1%
African American	.7%
Other	4%

Years of Work Experience (average)

as a licensed architect in California	11.8 years
in the profession of architecture	17.5 years
as an architect in another state or country	2.5 years

Average Number of Hours Worked Per Week Over the Past Five Years

Average – all respondents	42.3 hours
20 or fewer hours	8 %
More than 50 hours	11 %

Number of "Full-Time Employees"

1 employee (sole practitioner)	32 %
2 – 10 employees	35 %
11 – 25 employees	14 %
26 – 50 employees	7 %
More than 50 employees	12 %

Primary Work Setting

Architectural office	79%
Corporate setting	4%
Municipal	1.8%
Education institution	1.6%
County agency	1.5%
State agency	1.1%
Military	1.0%
Federal agency	.8%
Other	10%

Location of Primary Workplace

Metropolitan location (> 100K)	64%
Urban location (20–100K)	28%
Rural location (< 20K)	8%

Primary Position in Firm

Principal	47%
Project Architect/Manager	37%
Designer	3%
Job Captain	3%
Other	10%

California County in Which Primary Workplace is Located

Los Angeles	19%
San Francisco	10%
Orange County	10%
San Diego	7%
Alameda	6%
Sacramento	5%
Santa Clara	5%
Contra Costa	4%
Other counties	< 3%

Location of Majority of Projects

Single county	
Los Angeles	26%
San Diego	10%
San Francisco	7%
Santa Clara	6%
Orange County	6%
Alameda	4%
Other counties < 3 %	49%
Multiple counties	45%
Outside of California	4%

Contact with Recently Licensed Architects or Students Interns

Little contact	49%
Casual contact	30%
Teach	2%
Supervise	21%
Advise or mentor	6%
Work with	21%

Other Certifications, State Licenses, or Registrations

None	58%
Licensed as architect in another state	24%
Contractor	9%
Other	8%
All other options	2% or less

Highest Level of Formal Education

Accredited professional degree in architecture	35%
Advanced degree	26%
Four–year college degree	23%
Two-year degree	4%
High school only	4%
Non-accredited professional degree in architecture	2%

Locations Where Formal Education Completed

California	61%
U.S., outside of California	35%
Outside of U.S.	8%

License Status of Employees in the Office

(average number of architects)

Recently licensed (3 years or less)	In process of obtaining license	Licensed architects
1.0	1.7	7.2

Percentage of Work That Deals with Each Type of Structure

(responses were across categories and may not equal 100%)

	None	1-25%	26-50 %	51–75%	76-100%
Single-family residential	27%	33%	13%	12%	17%
Multi–unit residential	50%	36%	9%	3%	2%
Non-residential < 100,000 sq ft.	9%	40%	24%	16%	12%
Non-residential > 100,000 sq ft	51%	25%	11%	7%	6%
Specialized structures	33%	27%	9%	9%	20%

Type of Construction

(responses were across categories and may not equal 100%)

	None	1-25%	26-50%	51–75%	76-100%
New construction	3%	21%	27%	26%	24%
Remodel or renovation work	2%	29%	29%	22%	18%

Trends in Practice Responses

An initial analysis to Trends in Practice questions was conducted and percentages were calculated for the different response options. Since the responses to these questions were of high interest to the profession, CBAE authorized a further study to investigate how the characteristics and experience of different groups of architects are related to their view of the future of architecture in California. The results of this study will be available in early 1999 and will be provided to educators, regulators, and professional organizations.

Task and Knowledge Statements

An exhaustive evaluation of comments was conducted. No additional tasks or knowledge areas were suggested by the respondents, and no issues were raised concerning the substantive content of the task or knowledge statements. This is strong evidence of the face validity of the inventory of tasks and knowledge areas developed by the Job Analysis Committee, and suggests that the inventory is complete in terms of its coverage of the job domain of current architectural practice in California.

The inventory of tasks and knowledge areas is complete in terms of its coverage of the job domain of current architectural practice in California.

The summary of the survey results conducted on both scales for the tasks and the importance scale for knowledge statements is presented below. The data from the analysis of the survey responses are presented in Parts 1–5 in the following formats:

- Tasks sorted by descending order of mean frequency
- Tasks sorted by descending order of mean importance
- Tasks sorted by descending order of critical values
- Total list of knowledge statements sorted by descending order of mean importance
- Knowledge statements sorted by descending order of mean importance within Test Plan categories

The mean(average) frequency rating over all tasks was 4.18 with a standard deviation (SD) of 0.85, and the mean importance rating was 3.66 with an SD of 0.55 (it should be noted that the Frequency Rating Scale is a seven-point scale while the Importance Rating Scale is a five-point scale). The range of mean frequency ratings by respondent was from 1.63 to 6.94 over all tasks and from 1.00 to 5.00 for mean importance

When examined by content area, both the mean frequency ratings and the mean importance ratings are above the mid-point of their respective rating scales (the frequency scale mid-point is 4.00 and the importance scale mid-point is 3.00). This suggests that, on average, the tasks in each content area were performed by respondents "more than annually" and that the tasks were regarded as "important" in performing architectural work. (Mean ratings lower than the mid-point on either scale for any given content area would raise questions about the face validity of the tasks involved.)

The range in the mean frequency rating across the five content areas was from 4.01 (SD = 1.16) for Professional Responsibilities, to 4.47 (SD = 0.93) for Design Implementation. On the mean importance ratings the range was from 3.54 for both Professional Responsibilities (SD = 0.74) and Research, Design Analysis and Programming (SD = 0.67), to 3.73 (SD = 0.59) for Professional Services.

Critical values were computed in order to determine the test plan weights. Critical values were not computed for knowledge statements, which were rated only on the importance scale and are not given test plan weights. By determining the relative value calculated for each task statement, the critical value determines the relative point value of tasks and test plan categories. These point values guide the assignment of points to examination questions.

Following the analysis of survey data, the Job Analysis Committee was presented with the mean frequency and mean importance ratings for each of the individual the task statements to consider whether any task statements should be deleted from inclusion in the test plan.

Careful consideration was given to statements with the lowest frequency ratings or the lowest importance ratings to determine whether any task statements should be deleted. In their discussion, the Committee members were of the strong and unanimous opinion that all tasks should be included in the test plan.

Evaluation of Overlap with ARE

The Job Analysis Committee was lead through a rigorous procedure to evaluate the content of the 33 tasks as to their degree of overlap with the content of tasks in the ARE. After an orientation to the methodology, the Committee was led through the following process.

The Committee reviewed (both individually and as a group) the ARE Job Analysis task list and compared it to the CBAE task list, and identified the tasks that overlapped. After all tasks had been discussed and resolved, the Committee again reviewed those tasks that were found to overlap with the task content of the ARE to consider whether, for reasons of the special needs of California as a distinctive practice context, any of these tasks should still be retained in the CBAE Test Plan. A second consideration was whether the degree to which an overlapped task was tested in the ARE was at the level required to ensure competent practice in a California context. At the conclusion of the whole process, the Committee decided to remove 11 tasks from the original set of 33, reducing the number of tasks to be included on the CBAE Test Plan to 22 tasks.

Test Plan Development

The main use of the survey data was the creation of a Test Plan for the California Supplemental Examination. In conducting the task analysis for developing the new test plan for the CBAE Oral Examination program, PMES used the methodology that conforms to the testing and measurement guidelines of the American Psychological Association and is widely used by the testing community in developing test plans for examination programs. PMES has also used this methodology when developing test plans for other licensure and certification programs. As has been described and documented in detail in the main body of the Job Analysis Test Plan report, all of the evidence from the job analysis suggests that the results from the research are both valid and reliable and that the new test plan is technically sound and defensible.

The Test Plan Committee recommended that the original framework used in the survey document be retained as the organizational framework for the test plan rather than placing tasks in order of criticality. It was felt that the original framework was logical and the tasks reflected an appropriate sequence of architectural activities. The Test Plan is presented in Part 7.

The percentages that follow the category titles (e.g., Professional Services–32%) guide the assignment of points to the examination questions. For example, approximately 32% of the examination points will be assigned to questions that deal with the tasks in the Professional Services category.

Following each task, is a paragraph describing the concepts covered by the related knowledge statements that were presented in the Job Analysis survey. The Test Plan also shows, in italics and shaded text, 11 tasks from the CBAE Job Analysis survey that were not selected for inclusion in the test plan due to their adequate coverage in the ARE. They are presented here to give the full picture of architectural practice as represented on the Job Analysis survey. Examination questions are not developed from the 11 italicized, shaded task statements.

This Test Plan will provide the foundation for a defensible licensure examination program as it is based on an empirical study of the knowledges, skills, and abilities that describes the range, scope, and level of current entry-level professional practice. All of the evidence from the job analysis suggests that the results from the research are both valid and reliable and that the new test plan is technically sound and defensible.

Part 2

Tasks Sorted by Descending Order of Mean Frequency

MEAN FREQUENCY is the average frequency, calculated by adding together all of the frequency ratings obtained from the survey participants then dividing that figure by the total number of frequency ratings from the participants.

TASKS SORTED BY DESCENDING ORDER OF MEAN FREQUENCY

	TASKS	MEAN IMP.	MEAN FREQ.
T3	Determine which laws, codes, regulations, and standards apply.	4.64	5.44
T24	Assess and apply specific provisions of relevant laws, codes, regulations, and standards.	4.33	5.32
T31	Document and communicate design decisions for project implementation.	4.02	5.23
T29	Select and integrate appropriate building materials.	3.98	4.98
T12	Establish the relationships with consultants and other team members.	3.88	4.76
T26	Translate program information into a design solution.	4.16	4.74
T18	Represent professional capabilities and experience to clients.	3.82	4.71
T30	Select and integrate nonstructural building elements.	3.36	4.65
T10	Identify relationships with relevant regulatory agencies.	4.00	4.64
T28	Select and integrate appropriate building systems.	4.00	4.62
T32	Implement the construction administration process.	3.84	4.62
T5	Determine the scope of design services.	4.04	4.57
T9	Establish the role of the architect in relation to client and users.	3.94	4.57
T11	Establish an organizational structure for the delivery of the project.	3.77	4.39
T6	Determine the scope of construction phase services.	3.76	4.22
T20	Research and analyze information relevant to the development of an architectural program.	3.75	4.14

TASKS SORTED BY DESCENDING ORDER OF MEAN FREQUENCY (CONT.)

	TASKS	MEAN IMP.	MEAN FREQ.
T21	Assess individual user needs relative to human activities and comfort.	3.48	4.13
T2	Determine the scope of information regarding the natural systems and the built environment related to a site or facility.	3.95	4.11
T27	Apply information about the relationship of the natural systems and the built environment to the proposed project.	3.58	4.08
T16	Understand the application of the principles of construction law to the practice of architecture.	3.67	4.02
T1	Determine the scope of predesign services such as strategic facilities planning, programming, and preoccupancy services.	3.72	3.95
T17	Assess professional liability issues, including recognized standards of care, related to the conduct of an architectural practice.	3.73	3.94
T14	Apply California's Architects Practice Act to the provision of architectural services.	3.56	3.94
T22	Assess the inter-relationships between natural systems and the built environment.	3.40	3.78
T15	Apply principles of business law to the practice of architecture.	3.42	3.75
T19	Participate in professional development activities, such as continuing education.	3.06	3.67
T25	Assess the feasibility of the project.	3.40	3.64
T4	Determine the scope of project feasibility analysis.	3.39	3.53
T13	Establish business management systems to conduct an architectural practice.	3.39	3.48
T8	Establish the model for organization of the office.	3.35	3.46
T23	Assess the inter-relationships of societal factors and the built environment.	2.86	3.19
T33	Perform post-occupancy evaluations.	2.77	2.75
T7	Determine which expanded services might be provided such as facilities management, peer review, post occupancy studies.	2.67	2.74

Part 3

Tasks Sorted by Descending Order of Mean Importance

Mean Importance is the average importance, calculated by adding together all of the importance ratings obtained from the survey participants then dividing that figure by the total number of importance ratings from the participants.

TASKS SORTED BY DESCENDING ORDER OF MEAN IMPORTANCE

	Tasks	Mean Imp.	Mean Freq.
T3	Determine which laws, codes, regulations, and standards apply.	5.44	4.64
T24	Assess and apply specific provisions of relevant laws, codes, regulations, and standards.	5.32	4.33
T26	Translate program information into a design solution.	4.74	4.16
T5	Determine the scope of design services.	4.57	4.04
T31	Document and communicate design decisions for project implementation.	5.23	4.02
T10	Identify relationships with relevant regulatory agencies.	4.64	4.00
T28	Select and integrate appropriate building systems.	4.62	4.00
T29	Select and integrate appropriate building materials.	4.98	3.98
T2	Determine the scope of information regarding the natural systems and the built environment related to a site or facility.	4.11	3.95
T9	Establish the role of the architect in relation to client and users.	4.57	3.94
T12	Establish the relationships with consultants and other team members.	4.76	3.88
T32	Implement the construction administration process.	4.62	3.84
T18	Represent professional capabilities and experience to clients.	4.71	3.82
T11	Establish an organizational structure for the delivery of the project.	4.39	3.77
T6	Determine the scope of construction phase services.	4.22	3.76
T20	Research and analyze information relevant to the development of an architectural program.	4.14	3.75

TASKS SORTED BY DESCENDING ORDER OF MEAN IMPORTANCE (CONT.)

	TASKS	MEAN IMP.	MEAN FREQ.
T17	Assess professional liability issues, including recognized standards of care, related to the conduct of an architectural practice.	3.94	3.73
T1	Determine the scope of predesign services such as strategic facilities planning, programming, and preoccupancy services.	3.95	3.72
T16	Understand the application of the principles of construction law to the practice of architecture.	4.02	3.67
T27	Apply information about the relationship of the natural systems and the built environment to the proposed project.	4.08	3.58
T14	Apply California's Architects Practice Act to the provision of architectural services.	3.94	3.56
T21	Assess individual user needs relative to human activities and comfort.	4.13	3.48
T15	Apply principles of business law to the practice of architecture.	3.75	3.42
T22	Assess the inter-relationships between natural systems and the built environment.	3.78	3.40
T25	Assess the feasibility of the project.	3.64	3.40
T4	Determine the scope of project feasibility analysis.	3.53	3.39
T13	Establish business management systems to conduct an architectural practice.	3.48	3.39
T30	Select and integrate nonstructural building elements.	4.65	3.36
T8	Establish the model for organization of the office.	3.46	3.35
T19	Participate in professional development activities, such as continuing education.	3.67	3.06
T23	Assess the inter-relationships of societal factors and the built environment.	3.19	2.86
T33	Perform post-occupancy evaluations.	2.75	2.77
T7	Determine which expanded services might be provided such as facilities management, peer review, post occupancy studies.	2.74	2.67

Part 4

Tasks Sorted by Descending Order of Critical Value

CRITICAL VALUE is computed to determine the test plan weights, i.e. the relative point value of tasks and test plan categories. In doing so it determines the proportion of total examination points obtainable from exam questions addressing the content of that task.

CBAE Tasks Sorted by Descending Order of Critical Value

	TASKS	CRITICAL VALUE
T3	Determine which laws, codes, regulations, and standards apply.	75.0
T24	Assess and apply specific provisions of relevant laws, codes, regulations, and standards.	65.1
T31	Document and communicate design decisions for project implementation.	56.5
T26	Translate program information into a design solution.	54.2
T29	Select and integrate appropriate building materials.	52.9
T5	Determine the scope of design services.	49.6
T10	Identify relationships with relevant regulatory agencies.	49.6
T28	Select and integrate appropriate building systems.	49.5
T12	Establish the relationships with consultants and other team members.	48.3
T9	Establish the role of the architect in relation to client and users.	47.6
T18	Represent professional capabilities and experience to clients.	46.6
T32	Implement the construction administration process.	46.0
T2	Determine the scope of information regarding the natural systems and the built environment related to a site or facility.	43.0
T11	Establish an organizational structure for the delivery of the project.	42.4
T6	Determine the scope of construction phase services.	40.6
T20	Research and analyze information relevant to the development of an architectural program.	39.6

CBAE Tasks Sorted by Descending Order of Critical Value (cont.)

	Tasks	Critical Value
T17	Assess professional liability issues, including recognized standards of care, related to the conduct of an architectural practice.	37.4
T1	Determine the scope of predesign services such as strategic facilities planning, programming, and preoccupancy services.	37.2
T16	Understand the application of the principles of construction law to the practice of architecture.	37.2
T30	Select and integrate nonstructural building elements.	36.9
T27	Apply information about the relationship of the natural systems and the built environment to the proposed project.	36.2
T21	Assess individual user needs relative to human activities and comfort.	34.8
T14	Apply California's Architects Practice Act to the provision of architectural services.	34.5
T15	Apply principles of business law to the practice of architecture.	30.6
T22	Assess the inter-relationships between natural systems and the built environment.	30.6
T25	Assess the feasibility of the project.	29.4
T4	Determine the scope of project feasibility analysis.	28.4
T13	Establish business management systems to conduct an architectural practice.	28.0
T8	Establish the model for organization of the office.	27.2
T19	Participate in professional development activities, such as continuing education.	24.9
T23	Assess the inter-relationships of societal factors and the built environment.	19.2
T33	Perform post-occupancy evaluations.	15.7
T7	Determine which expanded services might be provided such as facilities management, peer review, post occupancy studies.	14.7

Part 5

Total List of Knowledge

Statements Sorted by Descending Order of Mean Importance

MEAN IMPORTANCE is the average importance, calculated by adding together all of the importance ratings obtained from the survey participants then dividing that figure by the total number of importance ratings from the participants.

TOTAL LIST OF KNOWLEDGE STATEMENTS SORTED BY DESCENDING ORDER OF MEAN IMPORTANCE

RANK		SHORTHAND VERSION OF KNOWLEDGE STATEMENTS	MEAN IMPORTANCE	STANDARD DEVIATION
1.	K11	K of which local laws, codes, regulations apply	4.47	0.75
2.	K12	K of which state laws, codes, regulations apply	4.40	0.76
3.	K100	K of local requirements such as General Plan	4.30	0.79
4.	K114	K of code requirements	4.26	0.76
5.	K45	K of contractual obligations	4.18	0.90
6.	K49	K of the agencies that may have jurisdiction	4.17	0.80
7.	K51	K of the architect role in obtaining approvals	4.12	0.81
8.	K101	K of local review and approval process	4.11	0.83
9.	K122	K of basic elements of structural, mechanical, …systems	4.11	0.77
10.	K25	K of process of communicating design	4.06	0.82
11.	K140	K of how to review/check documents	4.06	0.83
12.	K125	K of systems to resist seismic forces	4.05	0.88
13.	K67	K of liability responsibilities	4.03	0.95
14.	K5	K of topographical influences on the development	4.03	0.90
15.	K13	K of which federal laws, codes, regulations apply	4.01	1.00
16.	K128	K of coordination of consultants	3.98	0.85
17.	K136	K of documents required for graphic materials	3.98	0.85
18.	K120	K of natural/human caused hazardous conditions	3.98	0.92
19.	K59	K of document checking and review procedures	3.97	0.88

Total List of Knowledge Statements Sorted by Descending Order of Mean Importance (cont.)

Rank		Shorthand Version Of Knowledge Statements	Mean Importance	Standard Deviation
20.	K24	K of process of dev/doc design solutions	3.93	0.83
21.	K127	K of how to integrate building systems	3.92	0.83
22.	K137	K of documentation requirements for written materials	3.91	0.84
23.	K102	K of state requirements	3.91	0.92
24.	K70	K of responsibilities re owner/ contractor agreement	3.90	0.92
25.	K130	K of use/application of building materials	3.90	0.77
26.	K139	K of skills req for written/ verbal communication	3.90	0.84
27.	K27	K of traditional construction administration	3.89	0.88
28.	K52	K of process for communicating with agencies	3.89	0.84
29.	K126	K of systems to withstand nonseismic forces	3.88	0.93
30.	K44	K of methods to communicate with client	3.88	0.91
31.	K117	K of how to prepare a conceptual design	3.88	0.91
32.	K87	K of regulatory applications	3.87	0.89
33.	K20	K of physical site conditions	3.87	0.91
34.	K54	K of how to assess project requirements	3.85	0.85
35.	K142	K of documentation requirements	3.84	0.86
36.	K6	K of hydrological/geological impact	3.82	1.01
37.	K22	K of existing building conditions	3.82	0.91
38.	K10	K of availability of infrastructure	3.81	0.98
39.	K86	K of special requirements	3.80	0.92
40.	K132	K of how to integrate building materials	3.80	0.82
41.	K129	K of properties of building materials	3.80	0.81
42.	K76	K of methods to communicate with clients	3.76	0.93
43.	K23	K of types of design services	3.75	0.88
44.	K138	K of coordination requirements	3.75	0.88
45.	K55	K of the contractual relationships	3.74	0.90
46.	K53	K of project management	3.72	0.99
47.	K3	K of evaluating the information … in a program	3.72	0.93

Total List of Knowledge Statements Sorted by Descending Order of Mean Importance (cont.)

Rank		Shorthand Version Of Knowledge Statements	Mean Importance	Standard Deviation
48.	K77	K of how to accurately present capabilities	3.71	0.98
49.	K26	K of construction bidding and negotiation	3.71	0.89
50.	K19	K of project cost analysis and scheduling	3.71	0.96
51.	K113	K of site components & natural environment	3.71	0.86
52.	K28	K of extent of on-site representation	3.71	0.92
53.	K144	K of observation procedures	3.71	0.88
54.	K118	K of natural systems and their relationship to a project	3.69	0.93
55.	K112	K of technologies, systems, & products	3.67	0.81
56.	K121	K of how infrastructure relates to a project	3.66	0.91
57.	K111	K of program analysis	3.65	0.84
58.	K9	K of the influences of the existing built environment	3.64	0.89
59.	K143	K of submittal evaluation requirements	3.64	0.88
60.	K123	K of environmental control systems	3.63	0.81
61.	K66	K of appropriate contractual form	3.62	0.95
62.	K14	K of which community standards apply	3.62	1.12
63.	K43	K of relationships with different types of clients	3.62	0.97
64.	K57	K of procedures for coordinating personnel, tasks	3.61	0.93
65.	K103	K of state review and approval procedures	3.59	1.02
66.	K119	K of location and impacts on surroundings	3.57	0.89
67.	K2	K of researching applicable information	3.56	0.94
68.	K56	K of relationship with owner's consultants	3.55	0.92
69.	K95	K of environmental hazards	3.55	1.02
70.	K50	K of the interrelationships among various agencies	3.52	0.91
71.	K115	K of cost analysis	3.52	0.86
72.	K4	K of process for organizing the presentation	3.51	0.96
73.	K74	K of how standard of care affects liability	3.51	1.05

Total List of Knowledge Statements Sorted by Descending Order of Mean Importance (cont.)

Rank		Shorthand Version Of Knowledge Statements	Mean Importance	Standard Deviation
74.	K108	K of project scheduling	3.50	0.89
75.	K1	K of process for conducting interviews	3.49	1.03
76.	K75	K of relationships with clients	3.48	0.97
77.	K107	K of project budgeting	3.47	0.96
78.	K104	K of federal requirements	3.44	1.10
79.	K65	K of the Practice Act's requirements	3.44	1.05
80.	K73	K of methods of limiting liability	3.43	1.07
81.	K109	K of construction cost analysis	3.42	0.93
82.	K69	K of California construction laws	3.42	0.97
83.	K96	K of the existing context	3.40	0.92
84.	K84	K of activities, performance, and user profile	3.40	0.96
85.	K145	K of occupancy phase requirements	3.38	0.99
86.	K131	K of cost/life cycle of building materials	3.38	0.85
87.	K85	K of adjacency criteria	3.37	0.95
88.	K7	K of climatic influences on the development	3.37	0.95
89.	K93	K of natural systems, such as climate	3.34	0.97
90.	K58	K of techniques for documentation of team efforts	3.33	0.96
91.	K116	K of project delivery methods	3.31	0.92
92.	K94	K of sustainability, such as energy use	3.30	0.94
93.	K46	K of relationships with different types of users	3.29	0.95
94.	K62	K of technological resources	3.28	0.99
95.	K91	K of human comfort factors	3.28	0.88
96.	K141	K of current/emerging technology applications	3.28	0.89
97.	K135	K of how to integrate non-structural elements	3.26	0.87
98.	K124	K of energy management	3.25	0.85
99.	K18	K of how project impacts existing infrastructure	3.24	1.03

Total List of Knowledge Statements Sorted by Descending Order of Mean Importance (cont.)

Rank		Shorthand Version Of Knowledge Statements	Mean Importance	Standard Deviation
100.	K21	K of environmental conditions	3.24	0.95
101.	K134	K of appropriate use of non-structural elements	3.22	0.83
102.	K110	K of cost control methods	3.21	0.97
103.	K63	K of in-office financial management	3.20	1.12
104.	K78	K of communication tools such as marketing materials	3.19	1.01
105.	K64	K of in-office procedures for management decisions	3.15	1.10
106.	K68	K of laws related to employer/ employee responsibilities	3.14	1.10
107.	K35	K of value engineering	999	3.13
108.	K89	K of how to prepare a written program	3.13	0.98
109.	K90	K of activity requirements, such as ergonomics	3.12	0.94
110.	K133	K of furnishings, fixtures, & equipment	3.12	0.85
111.	K105	K of federal review and approval process	3.11	1.14
112.	K99	K of the needs of the community as a whole	3.09	0.96
113.	K29	K of overall project construction management services	3.08	1.01
114.	K47	K of methods to communicate with users	3.07	1.01
115.	K40	K of intra-office operational procedures	3.05	1.08
116.	K36	K of existing facilities surveys	3.05	1.00
117.	K92	K of behavioral factors	3.04	0.95
118.	K88	K of research and evaluation techniques	3.04	0.90
119.	K42	K of inter-office operational procedures	3.01	1.07
120.	K39	K of models of organization within the office	3.01	1.03
121.	K60	K of office business plan	2.99	1.08
122.	K15	K of how to determine types of potential users	2.95	1.03
123.	K41	K of alternative models of work relationships	2.95	1.05

Total List of Knowledge Statements Sorted by Descending Order of Mean Importance (cont.)

Rank		Shorthand Version Of Knowledge Statements	Mean Importance	Standard Deviation
124.	K48	K of how cultural differences impact interactions	2.94	1.07
125.	K83	K of typology, such as historic buildings	2.93	0.95
126.	K8	K of biological impacts on the development	2.93	1.04
127.	K37	K of environmental studies	2.93	0.99
128.	K71	K of varieties of insurance coverage	2.91	0.98
129.	K151	K of assess impact of project on future projects	2.90	0.99
130.	K148	K of how to assess material performance	2.84	0.90
131.	K149	K of assess energy systems performance	2.78	0.89
132.	K61	K of personnel programs and service	2.76	0.99
133.	K150	K of how to assess impact of project on context	2.74	0.93
134.	K38	K of project start-up and warranty	2.74	1.00
135.	K72	K of special insurance requirements	2.74	1.06
136.	K80	K of professional development opportunities	2.72	0.97
137.	K79	K of professional associations and resources	2.72	1.00
138.	K147	K of how to perform program evaluation	2.68	0.91
139.	K146	K of how to conduct system evaluation	2.64	0.87
140.	K97	K of cultural differences such as language and customs	2.63	0.99
141.	K98	K of socioeconomic and political factors	2.62	1.00
142.	K17	K of how to obtain an economic analysis	2.62	1.02
143.	K106	K of market analysis	2.60	0.97
144.	K30	K of post-occupancy performance evaluation	2.57	0.93
145.	K82	K of community service opportunities	2.56	0.95
146.	K34	K of strategic facilities planning	2.48	1.00
147.	K16	K of how to obtain a market analysis	2.45	0.97
148.	K31	K of facilities management services	2.43	0.97
149.	K81	K of intern development programs	2.42	0.95
150.	K33	K of peer review process	2.30	0.96
151.	K32	K of legal testimony services	2.27	1.00

Part 6

Knowledge Statements Sorted by Descending Order of Mean Importance Within Test Plan Categories

MEAN IMPORTANCE is the average importance, calculated by adding together all of the importance ratings obtained from the survey participants then dividing that figure by the total number of importance ratings from the participants.

KNOWLEDGE STATEMENTS SORTED BY DESCENDING ORDER OF MEAN IMPORTANCE WITHIN TEST PLAN CATEGORIES

A. PROFESSIONAL SERVICES

RANK		SHORTHAND VERSION OF KNOWLEDGE STATEMENTS	MEAN IMPORTANCE	STANDARD DEVIATION
1.	K11	K of which local laws, codes, regulations apply	4.47	0.75
2.	K12	K of which state laws, codes, regulations apply	4.40	0.76
3.	K25	K of process of communicating design	4.06	0.82
4.	K5	K of topographical influences on the development	4.03	0.90
5.	K13	K of which federal laws, codes, regulations apply	4.01	1.00
6.	K24	K of process of dev/doc design solutions	3.93	0.83
7.	K27	K of traditional construction administration	3.89	0.88
8.	K20	K of physical site conditions	3.87	0.91
9.	K6	K of hydrological/geological impact	3.82	1.01
10.	K22	K of existing building conditions	3.82	0.91
11.	K10	K of availability of infrastructure	3.81	0.98
12.	K23	K of types of design services	3.75	0.88
13.	K3	K of evaluating the information… in a program	3.72	0.93
14.	K26	K of construction bidding and negotiation	3.71	0.89
15.	K19	K of project cost analysis and scheduling	3.71	0.96
16.	K28	K of extent of on-site representation	3.71	0.92
17.	K9	K of the influences of the existing built environment	3.64	0.89
18.	K14	K of which community standards apply	3.62	1.12
19.	K2	K of researching applicable information	3.56	0.94
20.	K4	K of process for organizing the presentation	3.51	0.96

Knowledge Statements Sorted by Descending Order of Mean Importance Within Test Plan Categories (cont.)

A. PROFESSIONAL SERVICES (cont.)

Rank		Shorthand Version Of Knowledge Statements	Mean Importance	Standard Deviation
21.	K1	K of process for conducting interviews	3.49	1.03
22.	K7	K of climatic influences on the development	3.37	0.95
23.	K18	K of how project impacts existing infrastructure	3.24	1.03
24.	K21	K of environmental conditions	3.24	0.95
25.	K35	K of value engineering	3.13	1.00
26.	K29	K of overall project construction management	3.08	1.01
27.	K36	K of existing facilities surveys	3.05	1.00
28.	K15	K of how to determine types of potential users	2.95	1.03
29.	K8	K of biological impacts on the development	2.93	1.04
30.	K37	K of environmental studies	2.93	0.99
31.	K38	K of project start-up and warranty	2.74	1.00
32.	K17	K of how to obtain an economic analysis	2.62	1.02
33.	K30	K of post-occupancy performance evaluation	2.57	0.93
34.	K34	K of strategic facilities planning	2.48	1.00
35.	K16	K of how to obtain a market analysis	2.45	0.97
36.	K31	K of facilities management services	2.43	0.97
37.	K33	K of peer review process	2.30	0.96
38.	K32	K of legal testimony services	2.27	1.00

B. PROFESSIONAL ORGANIZATION

1.	K45	K of contractual obligations	4.18	0.90
2.	K49	K of the agencies that may have jurisdiction	4.17	0.80
3.	K51	K of the architect role in obtaining approvals	4.12	0.81
4.	K59	K of document checking and review procedures	3.97	0.88

Knowledge Statements Sorted by Descending Order of Mean Importance Within Test Plan Categories (cont.)

B. PROFESSIONAL ORGANIZATION (cont.)

Rank		Shorthand Version Of Knowledge Statements	Mean Importance	Standard Deviation
5.	K52	K of process for communicating with agencies	3.89	0.84
6.	K44	K of methods to communicate with clients	3.88	0.91
7.	K54	K of how to assess project requirements	3.85	0.85
8.	K55	K of the contractual relationships with consultants	3.74	0.90
9.	K53	K of project management	3.72	0.99
10.	K43	K of relationships with different types of clients	3.62	0.97
11.	K57	K of procedures for coordinating personnel, tasks	3.61	0.93
12.	K56	K of relationship with owner's consultants	3.55	0.92
13.	K50	K of the interrelationships among various agencies	3.52	0.91
14.	K58	K of techniques for documentation of team efforts	3.33	0.96
15.	K46	K of relationships with different types of users	3.29	0.95
16.	K62	K of technological resources	3.28	0.99
17.	K63	K of in-office financial management	3.20	1.12
18.	K64	K of in-office procedures for management decisions	3.15	1.10
19.	K47	K of methods to communicate with users	3.07	1.01
20.	K40	K of intra-office operational procedures	3.05	1.08
21.	K42	K of inter-office operational procedures	3.01	1.07
22.	K39	K of models of organization within the office	3.01	1.03
23.	K60	K of office business plan	2.99	1.08
24.	K41	K of alternative models of work relationships	2.95	1.05
25.	K48	K of how cultural differences impact interactions	2.94	1.07
26.	K61	K of personnel programs and service	2.76	0.99

Knowledge Statements Sorted by Descending Order of Mean Importance Within Test Plan Categories (cont.)

C. PROFESSIONAL RESPONSIBILITIES

Rank		Shorthand Version Of Knowledge Statements	Mean Importance	Standard Deviation
1.	K67	K of liability responsibilities	4.03	0.95
2.	K70	K of responsibilities re owner/ contractor agreement	3.90	0.92
3.	K76	K of methods to communicate with client	3.76	0.93
4.	K77	K of how to accurately present capabilities	3.71	0.98
5.	K66	K of appropriate contractual form	3.62	0.95
6.	K74	K of how standard of care affects liability	3.51	1.05
7.	K75	K of relationships with clients	3.48	0.97
8.	K65	K of the Practice Act's requirements	3.44	1.05
9.	K73	K of methods of limiting liability	3.43	1.07
10.	K69	K of California construction laws	3.42	0.97
11.	K78	K of communication tools such as marketing materials	3.19	1.01
12.	K68	K of laws related to employer/employee responsibilities	3.14	1.10
13.	K71	K of varieties of insurance coverage	2.91	0.98
14.	K72	K of special insurance requirements	2.74	1.06
15.	K80	K of professional development opportunities	2.72	0.97
16.	K79	K of professional associations and resources	2.72	1.00
17.	K82	K of community service opportunities	2.56	0.95
18.	K81	K of intern development programs	2.42	0.95

D. RESEARCH, DESIGN ANALYSIS AND PROGRAMMING

1.	K100	K of local requirements such as General Plan	4.30	0.79
2.	K101	K of local review and approval process	4.11	0.83
3.	K102	K of state requirements	3.91	0.92
4.	K87	K of regulatory applications	3.87	0.89
5.	K86	K of special requirements such as safety and security	3.80	0.92
6.	K103	K of state review and approval process	3.59	1.02

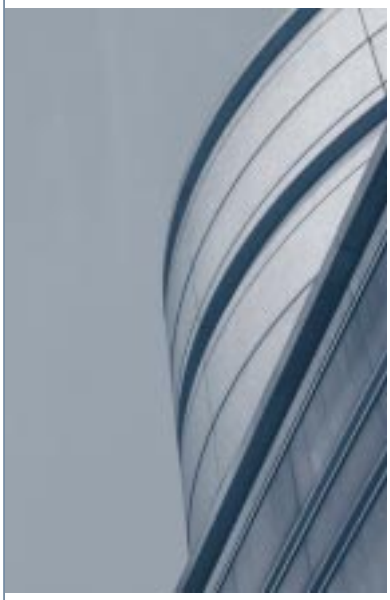
Knowledge Statements Sorted by Descending Order of Mean Importance Within Test Plan Categories (cont.)

D. RESEARCH, DESIGN ANALYSIS AND PROGRAMMING (cont.)

Rank		Shorthand Version Of Knowledge Statements	Mean Importance	Standard Deviation
7.	K95	K of environmental hazards	3.55	1.02
8.	K108	K of project scheduling	3.50	0.89
9.	K107	K of project budgeting	3.47	0.96
10.	K104	K of federal requirements	3.44	1.10
11.	K109	K of construction cost analysis	3.42	0.93
12.	K96	K of the existing context	3.40	0.92
13.	K84	K of activities, performance, and user profile	3.40	0.96
14.	K85	K of adjacency criteria	3.37	0.95
15.	K93	K of natural systems such as climate	3.34	0.97
16.	K94	K of sustainability, such as energy use	3.30	0.94
17.	K91	K of human comfort factors	3.28	0.88
18.	K110	K of cost control methods	3.21	0.97
19.	K89	K of how to prepare a written program	3.13	0.98
20.	K90	K of activity requirements, such as ergonomics	3.12	0.94
21.	K105	K of federal review and approval process	3.11	1.14
22.	K99	K of the needs of the community as a whole	3.09	0.96
23.	K92	K of behavioral factors	3.04	0.95
24.	K88	K of research and evaluation techniques	3.04	0.90
25.	K83	K of typology, such as historic buildings	2.93	0.95
26.	K97	K of cultural differences such as language and customs	2.63	0.99
27.	K98	K of socioeconomic and political factors	2.62	1.00
28.	K106	K of market analysis	2.60	0.97

E. DESIGN IMPLEMENTATION

1.	K114	K of code requirements	4.26	0.76
2.	K122	K of basic elements of structural, mechanical…systems	4.11	0.77



Knowledge Statements Sorted by Descending Order of Mean Importance Within Test Plan Categories (cont.)

E. Design Implementation (cont.)

Rank		Shorthand Version of Knowledge Statements	Mean Importance	Standard Deviation
3.	K140	K of how to review/check documents	4.06	0.83
4.	K125	K of systems to resist seismic forces	4.05	0.88
5.	K128	K of coordination of consultants	3.98	0.85
6.	K136	K of documentation requirements for graphic materials	3.98	0.85
7.	K120	K of natural/human caused hazardous conditions	3.98	0.92
8.	K127	K of how to integrate building systems	3.92	0.83
9.	K137	K of documentation requirements for written materials	3.91	0.84
10.	K130	K of use/application of building materials	3.90	0.77
11.	K139	K of skills required for written/verbal communication	3.90	0.84
12.	K126	K of systems to withstand nonseismic forces	3.88	0.93
13.	K117	K of how to prepare a conceptual design	3.88	0.91
14.	K142	K of documentation requirements	3.84	0.86
15.	K132	K of how to integrate building materials	3.80	0.82
16.	K129	K of properties of building materials	3.80	0.81
17.	K138	K of coordination requirements	3.75	0.88
18.	K113	K of site components and natural environment	3.71	0.86
19.	K144	K of observation procedures	3.71	0.88
20.	K118	K of natural systems and their relationship to a project	3.69	0.93
21.	K112	K of technologies, systems, and products	3.67	0.81
22.	K121	K of how infrastructure relates to a project	3.66	0.91
23.	K111	K of program analysis	3.65	0.84
24.	K143	K of submittal evaluation requirements	3.64	0.88
25.	K123	K of environmental control systems	3.63	0.81
26.	K119	K of location and impacts on surroundings	3.57	0.89
27.	K115	K of cost analysis	3.52	0.86
28.	K145	K of occupancy phase requirements	3.38	0.99

Knowledge Statements Sorted by Descending Order of Mean Importance Within Test Plan Categories (cont.)

E. DESIGN IMPLEMENTATION (cont.)

Rank		Shorthand Version Of Knowledge Statements	Mean Importance	Standard Deviation
29.	K131	K of cost/life cycle of building materials	3.38	0.85
30.	K116	K of project delivery methods	3.31	0.92
31.	K141	K of current/emerging technology applications	3.28	0.89
32.	K135	K of how to integrate non-structural elements	3.26	0.87
33.	K124	K of energy management	3.25	0.85
34.	K134	K of appropriate use of non-structural elements	3.22	0.83
35.	K133	K of furnishings, fixtures, & equipment	3.12	0.85
36.	K151	K of assess impact of project on future projects	2.90	0.99
37.	K148	K of how to assess material performance	2.84	0.90
38.	K149	K of assess energy systems performance	2.78	0.89
39.	K150	K of assess impact of project on context	2.74	0.93
40.	K147	K of how to perform program evaluation	2.68	0.91
41.	K146	K of how to conduct system evaluation	2.64	0.87

Part 7

Test Plan

Test Plan

The following Test Plan document consists of a list of tasks that California architects perform, with each task followed by a paragraph describing the knowledge that supports the task.

All questions in the California Supplemental Examination address one or more tasks of the Test Plan. While not every task will be addressed by every form of the examination, candidates should be prepared to respond to questions dealing with any of the Test Plan tasks.

The 22 tasks in the Test Plan are numbered "1" through "22."

The Test Plan also shows, in italics and shaded text, 11 tasks from the CBAE Job Analysis survey that were not selected for inclusion in the test plan due to their adequate coverage in the ARE. They are presented here to give the full picture of architectural practice as represented on the Job Analysis survey. Examination questions are not developed from the 11 italicized, shaded task statements.

The percentages that follow the category titles (e.g., Professional Services–32%) guide the assignment of points to the examination questions. For example, approximately 32% of the examination points will be assigned to questions that deal with the tasks in the Professional Services category.

I. ORGANIZATION OF ARCHITECTURAL PRACTICE

Application of knowledge necessary to manage and provide professional services in a competent, ethical, legal, cost-effective, and timely manner.

A. PROFESSIONAL SERVICES—The scope of services provided to a client that support the development of an architectural project. (32%)

1. Determine the scope of predesign services such as strategic facilities planning and programming.
To determine the scope of predesign services, apply knowledge of processes for conducting interviews and surveys, researching applicable information, evaluating that information for inclusion in a program, and organizing the presentation of relevant information.

2. Determine the scope of information regarding the natural systems and the built environment related to a site or facility.
Apply knowledge of topographical influences, hydrological/geological impacts, climatic influences, biological impacts, influences of the existing built environ-

ment, and the availability of infrastructure to determine the scope of information that will influence the development of a site or facility.

3. **Determine which laws, codes, regulations, and standards apply.**
   Use knowledge of local, California state, and federal laws, codes, regulations, and standards as well as knowledge of private community standards (such as homeowner association design guidelines, CC&Rs, and easements) to determine which of these apply to a project.

4. **Determine the scope of project feasibility analysis.**
   To determine the scope of project feasibility analysis, apply knowledge of physical site conditions (such as geological and topographical), environmental conditions (such as biological and climatic), and existing building conditions (such as size and configuration); apply knowledge of how the project impacts existing infrastructure (such as roads, utilities, schools). Also, apply knowledge of project cost analysis and scheduling, and knowledge of processes such as how to determine types of potential users, how to obtain a market analysis, and how to obtain an economic analysis.

5. **Determine the scope of design services.**
   To determine the scope of design services, apply knowledge of the types of design services and of project scheduling. Also, apply knowledge of the processes of developing, documenting, and communicating design solutions, and of the processes of construction bidding and negotiation.

6. **Determine the scope of construction phase services.**
   Apply knowledge of traditional construction administration services (such as periodic observation, submittal review, and project close-out) and of the extent of on-site representation appropriate for a client or project to determine the scope of construction phase services.

7. **Determine which expanded services might be provided such as facilities management, peer review, post occupancy studies.**
   Apply knowledge of such services as overall project construction management, post-occupancy performance evaluation, facilities management and maintenance and operation programming, legal testimony, peer review, strategic facilities planning, value engineering, existing

facilities surveys, environmental studies, and project start-up and warranty review to determine which expanded services might be provided.

B. PROFESSIONAL ORGANIZATION—The processes a practitioner uses for organizing human and physical resources to deliver services. (14%)

8. Establish the role of the architect in relation to client and users.

To establish the architect's role in relation to clients and users, apply knowledge of relationships with different types of clients, different types of users, and the client's consultants; apply knowledge of how cultural differences impact interactions with clients and users. Also, apply knowledge of methods to communicate with clients (such as meetings, memoranda, and reports) and with users (such as focus groups, interviews, and hearings), as well as knowledge of contractual obligations with respect to clients.

9. Identify architect's relationships with relevant regulatory agencies.

To identify the architect's relationships with relevant regulatory agencies, apply knowledge of which agencies have jurisdiction over a project, of the interrelationships between agencies, of the process for communicating with agencies, and of the architect's role in obtaining approvals.

10. Establish business management systems to conduct an architectural practice.

To establish business management systems, apply knowledge of office business plans (such as mission statements and marketing strategies), personnel programs and services (such as training and benefits), and technological resources (including communication, computing, and imaging devices and software). Also, apply knowledge of procedures for in-office financial management, for management decisions, and for coordinating personnel, tasks, and schedules.

Establish the model for organization of the office.

Establish an organizational structure for the delivery of the project.

Establish the relationships with consultants and other team members.

C. PROFESSIONAL RESPONSIBILITIES—The laws, regulations, and professional standards that guide architectural practice. (20%)

11. Apply California's Architects Practice Act to the provision of architectural services.
Apply knowledge of the requirements of California's Architects Practice Act to the provision of architectural services.

12. Apply principles of business law to the practice of architecture.
Apply principles of business law using knowledge of how standard of care affects liability, of the appropriate contractual form for requested services, and of liability (legal) responsibilities. Also, apply knowledge of methods of limiting liability risks (such as contract provisions) and of laws related to employer/employee responsibilities.

13. Understand the application of the principles of construction law to the practice of architecture.
Understand the application of the principles of California construction laws (such as Mechanics' Lien Law and minimum warranty periods) and apply knowledge of the concepts of the architect's responsibilities associated with the conditions of owner/contractor agreements to the practice of architecture.

14. Represent professional capabilities and experience to clients.
Apply knowledge of methods used to accurately communicate and present professional capabilities and experience, of relationships with clients (including cultural considerations), and of communication tools (such as marketing materials and resumes) to represent architectural capabilities to clients.

15. Participate in professional development activities, such as continuing education.
Participate in professional development activities using knowledge of professional associations and resources (such as AIA or NCARB), professional development opportunities (such as AIA and NCARB continuing education systems or university extension programs), intern development programs (such as NCARB's IDP), and community service opportunities (such as local planning commission, and design review).

Assess professional liability issues, including recognized standards of care, related to the conduct of an architectural practice.

II. DELIVERY OF ARCHITECTURAL SERVICES

The application and integration of architectural principles and knowledge to create or modify built environments consistent with the protection of the public's health, safety, and welfare.

D. RESEARCH, DESIGN ANALYSIS AND PROGRAMMING—Knowledge of the procedures necessary for the assessment of relevant information in preparation for design of a project. (13%)

16. Assess the inter-relationships between natural systems and the built environment.
Apply knowledge of regional and local natural ecosystems (such as climate, geology, and vegetation), sustainability (such as energy use, resource conservation, and life cycle cost analysis), natural and human caused environmental hazards (such as seismic activity and fire), and the existing context to assess the two-way relationships between natural ecosystems and the built environment.

17. Assess the inter-relationships of societal factors and the built environment.
Apply knowledge of the needs of the community as a whole, socioeconomic and political factors, and cultural differences (such as language and customs) to assess the inter-relationships of societal factors and the built environment.

18. Assess and apply specific provisions of relevant laws, codes, regulations, and standards.
To assess and apply specific provisions of relevant laws, codes, regulations, and standards, apply knowledge of regional, local requirements (such as General Plan, Specific Plan, Building Code, Zoning Ordinance, and Design Review), local review and approval processes (such as plan check, design review, and environmental review), state requirements (such as CBC energy, accessibility, seismic), state review and approval processes (such as California Coastal Commission, CEQA, Fish and Game), federal requirements (such as ADA and OSHA), and federal review and approval processes (such as the Corps of Engineers, and US Fish and Wildlife).

Research and analyze information relevant to the development of an architectural program.

Assess individual user needs relative to human activities and comfort.

Assess the feasibility of the project.

E. DESIGN IMPLEMENTATION—Synthesis and application of information that leads to a solution that responds to defined project requirements. (21%)

19. Integrate appropriate building systems.
Apply knowledge of basic elements of structural, mechanical, electrical, plumbing, communication, security, and conveying systems; knowledge of environmental control systems, lighting, acoustics; knowledge of energy management; knowledge of systems to resist seismic forces and of systems to withstand nonseismic vertical and lateral forces; and knowledge of how to integrate building systems and coordinate systems with consultants.

20. Integrate appropriate building materials.
Apply knowledge of the properties, use, application, cost and life cycle considerations of building materials to integrate building materials into a project.

21. Select and integrate nonstructural building elements.
Apply knowledge of nonstructural building elements (such as furnishings, fixtures, and equipment items), of the appropriate use of nonstructural elements, and use knowledge of how such elements are integrated into and affect building systems.

22. Implement the construction administration process.
Apply knowledge of documentation requirements, submittal evaluation requirements, observation procedures, and occupancy phase requirements (such as close-out procedures, lien laws, start-up procedures, and building commissioning) to implement the construction administration process.

Translate program information into a design solution.

Apply information about the relationship of the natural systems and the built environment to the proposed project.

Document and communicate design decisions for project implementation.

Perform post-occupancy evaluations.